

# NASA TECH BRIEF

## Langley Research Center

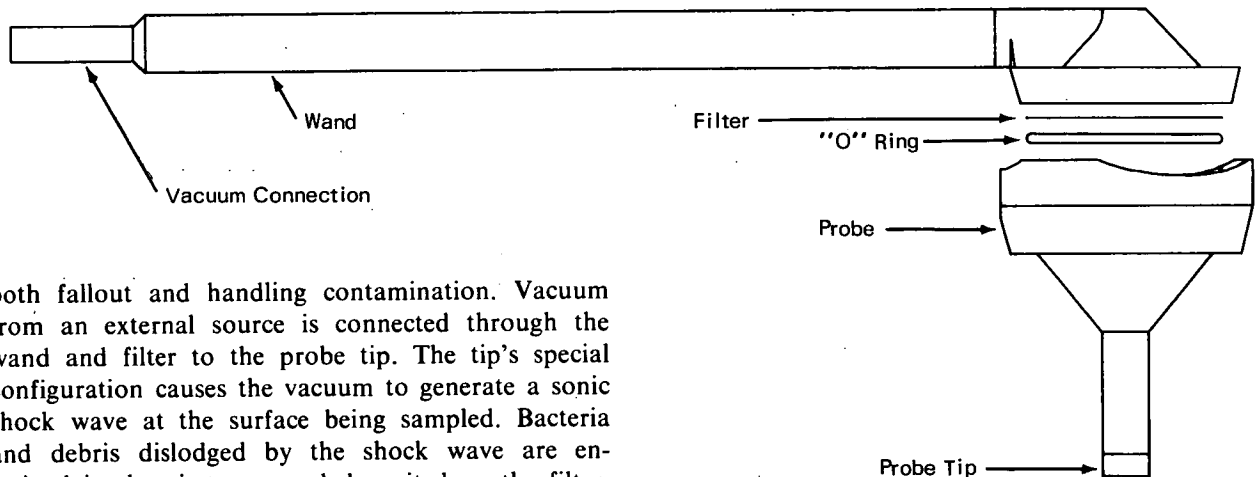


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### Improved Vacuum Probe Collects Surface-Contamination Samples

A redesigned vacuum-probe surface sampler, consisting of a wand equipped with a disposable probe and filter assembly, efficiently collects specimens of

both fallout and handling contamination. Vacuum from an external source is connected through the wand and filter to the probe tip. The tip's special configuration causes the vacuum to generate a sonic shock wave at the surface being sampled. Bacteria and debris dislodged by the shock wave are entrained in the airstream and deposited on the filter. The filter is then removed and the debris analyzed by conventional techniques.



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The previous design, although quite functional, had operational limitations. The removable probe was secured to the wand by mechanical pressure, using a "C" clamp with a knurled knob. The handling required to connect the sterile probe to the wand greatly increased the possibility of contamination. In addition, the probe was made of aluminum, making disposal an expensive alternative to the inconvenient recleaning and sterilizing.

The new surface sampler (see fig.) has an inexpensive, disposable, plastic probe with a novel connect/disconnect feature having a greatly reduced chance of contamination. A press-fit lock with surfaces tapered at 15° provides a simple, reliable con-

nection, and a tripod extension of the probe beyond the wand head permits easy disconnection with a few gentle taps. Since both the head of the handle

unit and the disposable probe are molded to a close tolerance, the lock seals tightly against an "O" ring and holds well when the probe is subjected to lateral blows. The handle unit and the probe are injection molded of polystyrene. The tip may be an integral part of the probe mold, or the mold may contain a spigot for accepting special purpose tips. Teflon tips, for example, could be used on surfaces that might be damaged by polystyrene.

The instrument is designed for use with a vacuum system capable of pulling 28 in. of vacuum at a flow rate of 2 cfm. For microbiological sampling, a 0.45-micron membrane filter is used; for other applications, filters with larger holes can be used.

(continued overleaf)

Finer filters with smaller holes can also be used if the proper flow rate can be maintained. Lower flow rates result in lower recovery efficiencies.

In performance tests of the improved vacuum probe, fallout contamination removal averaged 99%; recovery from both the filter and probe averaged 89%. For handling contamination, removal averaged 55%, with recovery averaging 45%.

**Notes:**

1. Information on the original vacuum probe sampler can be found in NASA Tech Brief 68-10231.
2. The following documentation may be obtained from:

National Technical Information Service  
Springfield, Virginia 22151  
Single document price \$3.00  
(or microfiche \$0.95)

**Reference:**

NASA CR-111796 (N71-14831), Testing and  
Fabrication of Plastic Vacuum Probe  
Surface Samplers

**Patent status:**

Inquiries about obtaining rights for the commercial use of this invention may be made to:

Patent Counsel  
Mail Code 173  
Langley Research Center  
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